

Serial No. 10/630,483

-2-

Docket No. 1232-5087

This listing of claims will replace all prior versions, and listings, of claims in the application:

**Listing of Claims:**

1. (Currently Amended) A projection optical system which projects a final image of an original image onto a projection plane, the projection optical system comprising:

a refractive optical system which includes a plurality of refractive optical elements; and

a reflective optical system which includes a plurality of reflective surfaces, each of the reflective surfaces having an optical power,

wherein an image light from the original image is incident on the reflective optical system through the refractive optical system,

a central principal ray is oblique to the projection plane, where the central principal ray is a principal ray of a light flux incident on the center of the final image projected onto the projection plane, and

the following condition is satisfied:

$$57.05 \text{ mm} \leq f_a \leq 98.85 \text{ mm}$$

where  $f_a$  represents a focal length of the refractive optical system.

2. (Currently Amended) The projection optical system according to claim 1, wherein an ~~[[the]]~~ intermediate image of the original image is formed within the reflective optical system.

3. (Currently Amended) The projection optical system according to claim 2, wherein at least one of optical surfaces of the reflective optical system each having an optical power disposed immediately before and after the position where the intermediate image is formed is the reflective surface.

4. (Canceled)

5. (Previously Presented) The projection optical system according to claim 1, wherein the following expression is satisfied:

64394 v1

Serial No. 10/630,483

-3-

Docket No. 1232-5087

$$|f_a/f| > 2$$

where  $f_a$  represents a focal length of the refractive optical system and  $f$  represents a focal length of the projection optical system in a longitudinal direction of the projection plane.

6. (Original) The projection optical system according to claim 1, wherein at least one of the reflective surfaces is a rotationally asymmetric surface.

7. (Currently Amended) The projection optical system according to claim 2, wherein the reflective optical system includes two reflective surfaces which have optical powers and are disposed at least one of optical surfaces each having an optical power disposed immediately before or and after the position where the intermediate image is formed, and  
wherein at least one of the reflective surfaces has an asymmetric optical power in azimuthal directions of 0 and 90 degrees.

8. (Currently Amended) The projection optical system according to claim 2, wherein the reflective optical system includes two reflective surfaces which have optical powers and are disposed each of optical surfaces each having an optical power disposed immediately before and after the position where the intermediate image is formed, and  
wherein each reflecting surface is shaped in azimuthal directions of 0 and 90 degrees such that the surface has a concave shape toward each of the azimuthal directions when the refractive optical system has negative curvature of field.

9. (Currently Amended) The projection optical system according to claim 2, wherein the reflecting optical system includes two reflecting surfaces which have optical powers and are disposed each of optical surfaces each having an optical power disposed immediately before and after the position where the intermediate image is formed, and  
wherein each reflecting surface is shaped in azimuthal directions of 0 and 90 degrees such that the surface has a convex shape toward each of the azimuthal directions when the refractive optical system has positive curvature of field.

Serial No. 10/630,483

-4-

Docket No. 1232-5087

10. (Previously Presented) The projection optical system according to claim 1, wherein a normal line to a surface of the original image is substantially perpendicular to a normal line to the projection plane.

11. (Previously Presented) The projection optical system according to claim 1, wherein an optical axis of the refractive optical system is substantially perpendicular to a normal line to the projection plane.

12. (Original) The projection optical system according to claim 11, wherein the optical axis of the refractive optical system is substantially parallel to a normal line to a plane including a reference axis which is an optical path of the central principal ray within the reflective optical system.

13 (Original) The projection optical system according to claim 11, wherein the optical axis of the refractive optical system is substantially perpendicular to a normal line to a plane including a reference axis which is an optical path of the central principal ray within the reflective optical system.

14. (Previously Presented) A projection type image display apparatus comprising:  
an image forming element which forms an original image; and  
the projection optical system according to claim 1, which projects luminous flux from the original image onto a projection plane.

15. (Previously Presented) The projection type image display apparatus according to claim 14, further comprising a plane reflective surface provided on an optical path from the reflective optical system to the projection plane.

16. (Original) An image display system comprising:  
the projection type image display apparatus according to claim 14, and  
an image information supply apparatus which supplies image information for displaying an original image on the image forming element to the projection type image display apparatus.

64394 v1

Serial No. 10/630,483

-5-

Docket No. 1232-5087

17. (Previously Presented) The projection optical system according to claim 5, wherein the following condition is satisfied:

$$|f_a/f| \geq 4.68$$

where  $f_a$  represents a focal length of the refractive optical system and  $f$  represents a focal length of the projection optical system in a longitudinal direction of the projection plane.

Claims 18-22 (Canceled)